

University of Alaska Anchorage  
School of Education  
3211 Providence Drive  
Anchorage, Alaska 99508-8269

**ED 581 Professional Learning in Science Education:  
Denali's Mosses and Lichens**

**1 Credit, Graded P/NP**

**Summer 2026**

**Course Sponsor:** Alaska Geographic, Murie Science and Learning Center, Denali National Park

**Instructor:** James Walton

**Educational Resource:** Paula Davis

**Primary Grading Instructor:** Jessica Brillhart

**Facilitating Instructor:** Jessica Brillhart

**Contact Information Address:** Alaska Geographic, Murie Science and Learning Center, P.O. Box 136, Denali Park, AK 99755

**Telephone:** (907) 771-8485

**Email address:** courses@akgeo.org

**Course Meeting Information**

**Location:** Murie Science and Learning Center, Denali National Park & Preserve entrance

**Start and End Date:** August 14 – 16, 2026

**Class Day(s) & Time(s):** August 14th, 6:30pm through August 16th 4pm, continuous residential course

**Final Project Due:** Last day of class.

**Course Description:** Interior Alaska is a landscape defined by its lichens and bryophytes such as mosses and liverworts. Over 1,000 species inhabit the trees, tundra, and rocky slopes of Denali National Park and Preserve. This course is designed for educators who wish to understand these diverse yet often overlooked organisms. Denali botanist James Walton will teach the basic biology, life histories, and ecology of bryophytes and lichens through a combination of landscape-scale exploration and focused study. Course will strike out into a variety of habitats to observe these organisms in their natural settings and participants will learn to recognize common

and charismatic species while identifying their specific microhabitat preferences. Participants will consider how to integrate their learning from this fieldwork course into their teaching or educational environments.

**Intended Audience:** Teachers and other interested educators

**Enrollment Restrictions:** None

**Course Prerequisite/Co-requisites:** None

**Course Design:**

- a. Requires 15 contact hours and approximately 30 hours of engaged learning.
- b. Does not apply to any UAA certificate or degree program.
- c. No UAA lab and/or materials fees beyond standard charges.
- d. This Murie Science and Learning Center course will be entirely field-based. Learning will be achieved through lectures, group discussions, field observations, and field activities. This course is based upon the collegial sharing, collaboration, and support of the participants and facilitator as a community of learners. Course activities will include common readings and group discussions, collective learning processes, peer coaching/mentoring, and reflective practices.

**Instructional Goals and Defined Outcomes:**

RESEARCH BASED THEORY/PRINCIPLES/PRACTICES/TRENDS (CONTENT)

1.0 Instructional Goals:

Instructor will define the basic biological and physiological functions of mosses and lichens as they compare to other plants and guide exploration into the diversity of mosses and lichens in interior Alaska. Instructor will communicate the importance of mosses and lichens in the terrestrial environment.

Defined Outcomes:

- 1.1 Participants will analyze and reflect upon the similarities and differences between mosses and lichens and other plants.
- 1.2 Participants will witness many different species of mosses and lichens in their natural habitat and learn characteristics on how to tell different species apart.
- 1.3 Participants will identify ecological roles that mosses and lichens play in interior Alaska.

THEORY INTO PRACTICE (APPLICATION)

2.0 Instructional Goal:

Instructor will provide activities to help newcomers recognize the diversity of moss and lichen species in interior Alaska. Instructor will provide stories on the impact of particular species on local ecology.

Defined Outcomes:

- 2.1 Participants will be able to recognize the diversity of moss and lichen species in interior Alaska and describe the impact of particular species on local ecology.
- 2.2 Participants will describe how they will integrate their experiences into their teaching or educational environments.

## REFLECTION ON THEORY INTO PRACTICE (REFLECTION)

### 3.0 Instructional Goal:

Engage participants in discussions, reflective journaling and informal sharing about science instruction and how to incorporate gained knowledge and experience into their classrooms.

### Defined Outcome:

Participants will review and reflect upon the scientific information covered. Participants will complete a journal, reflecting on how the information can be shared with their students.

## RELATIONSHIP TO STANDARDS

### 4.0 Instructional Goal:

Familiarize participants with science content standards addressed by the strategies and concepts presented.

### Defined Outcome:

Participants will identify the Science-Content standards applicable to their classroom.

### **Writing Style Requirements:**

Participants' writing will reflect the clarity, conciseness, and creativity expected of post-baccalaureate certificated educators.

### **Attendance and Make-up Policy:**

Participants are expected to actively participate in all classes as a contributing member of a learning community. Attendance is mandatory, and due to the ongoing field-based nature of this course, make-up work is not possible.

### **Course Assignments, Assessment of Learning, and Grading System:**

Course grading will be Pass/No Pass based upon the following:

- a. Participation 50%  
Participants will be expected to actively and collegially participate in discussions, activities, and other process experiences during the seminar.
- b. Journal completion 50%  
Participants will complete journal assignments to be turned in to MSLC field guide on the last day of class. Assignments will include thoughtful reflection based upon seminar experience and an application plan of how participants will integrate issues and content discussed into their own classroom setting.

### **Quality of Work**

#### **Grade of "Pass"**

Passing work includes all components of the assignment and meets proficient criteria. It is focused, developed, supported, logical, and acceptable work with minimal errors. Work of this quality indicates understanding of key concepts and knowledge base.

#### **Grade of "No Pass"**

Work graded "No Pass" may lack key criteria/components of the task and show little or no evidence of conceptual understanding or knowledge utilization. Work may also

show minimal or no organization/development and/or clear focus (may be difficult to follow) and may contain numerous errors. This grade indicates minimal or no knowledge or concept development. It may also mean that work was not attempted.

### Course Calendar/Schedule:

- |          |                       |  |
|----------|-----------------------|--|
| Friday   | 6:00 p.m. – 6:30 p.m. | Greeting and check in at MSLC  |
|          | 6:30 p.m. – 7:30 p.m. | Introduction, orientation & overview <ul style="list-style-type: none"><li>○ Overview of moss and lichen biology and introduction to our most common species</li></ul>   |
|          | 7:30 p.m. – 9:00 p.m. | Drive to MSLC Field Camp and settle in   |
| Saturday | 9:00 a.m. – 5:00 p.m. | Exploration of Denali <ul style="list-style-type: none"><li>○ Visits to multiple habitat types to explore diversity across the landscape</li><li>○ Discussions on individual species and their roles in community ecology</li></ul>  |
|          | 6:00 p.m. – 8:00 p.m. | Dinner and evening discussions <ul style="list-style-type: none"><li>○ Discussion of day's findings, and the results of fine-tuning your eye to the smaller-scale world of mosses and lichens.</li><li>○ Teacher study group to discuss the day's activities and how the information can be shared with students</li><li>○ Identify applicable science content standards addressed by course content</li></ul> |
| Sunday   | 9:00 a.m. – 3:00 p.m. | Continued exploration of Denali <ul style="list-style-type: none"><li>○ Continued study of moss and lichen diversity across the landscape.</li><li>○ Continued search for individual species that present great stories about their roles in community ecology.</li></ul>  |
|          | 3:00 p.m. – 4:00 p.m. | Return drive to MSLC   |

**Final Project Due:** last day of course

### Course Texts, Readings, Handouts, and Library Reserve:

#### Required Text/Materials:

Hampton-Miller, C. & Walton, J. (2025). *Common Lichens of Northern Alaska*. National Park Service Retrieved from: <https://www.npshistory.com/publications/alaska/lichens-2025.pdf>

Walton, J. & Stehn, S. (2014). Moving beyond the minimum: The addition of nonvascular plant inventories to vegetation research in Alaska's national parks. *Park Science* 31(1), pages 62-69. Retrieved from: <https://npshistory.com/newsletters/park-science/v31n1.pdf>

#### Suggested Text/Materials:

Flora of North America, Volumes 27 and 28. Retrieved from: [https://floranorthamerica.org/Volume\\_27](https://floranorthamerica.org/Volume_27) and [https://floranorthamerica.org/Volume\\_28](https://floranorthamerica.org/Volume_28)

Hasselbach, L. & Neitlich, P. (1998) *A Genus Key to the Lichens of Alaska*. National Park Service. Retrieved from: <https://www.npshistory.com/publications/alaska/lichens.pdf>

iNaturalist (n.d.) Retrieved from: <https://www.inaturalist.org/>

Johnson, D., Kershaw, L., MacKinnon, A., & Pojar, J. (1995). *Plants of the western boreal forest & aspen parkland*. Edmonton, Alberta: Lone Pine Publishing.

Ways of Enlichenment (n.d.) Retrieved from: <https://www.waysofenlichenment.net/>

#### Content References:

Alaska Wildflowers Interior App. (n.d.)

Retrieved from: <https://apps.apple.com/us/app/alaska-wildflowers-interior/id6450400458> (Apple) or <https://play.google.com/store/apps/details?id=com.wildflowersearch.ak3wildflowers&hl=en-US&pli=1> (Android)

Brodo, I. M., Sharnoff, S., & Sharnoff, S. D. (2001). *Lichens of North America*. New Haven: Yale University Press.

Consortium of Bryophyte Herbaria. (n.d.)

Retrieved from: <https://bryophyteportal.org/portal/index.php>

Consortium of Lichen Herbaria. (n.d.) Retrieved from: <https://lichenportal.org/portal/index.php>

Glime, J. (2007+). E-book. *Bryophyte Ecology*. Retrieved from <http://www.bryoecol.mtu.edu/>.

McCune, B., & Geiser, L. (2023). *Macrolichens of the Pacific Northwest* (3<sup>rd</sup> ed.). Corvallis, Oregon: Oregon State University Press.

National Park Service (2016). DenaliFlora—An Electronic Field Guide for Your Mobile Device.

Retrieved from: <https://www.nps.gov/articles/denali-crp-plant-app.htm>

Stehn, S., Walton, J., & Roland, C. (2013). *A bryophyte species list for Denali National Park and Preserve, Alaska with comments on several new and noteworthy records*. *Evansia*, 30(1), 31-45. Retrieved from: <https://irma.nps.gov/DataStore/DownloadFile/467180>.

Stehn, S. J. Walton, P. Nelson, C. Hampton-Miller, and C. Roland. (2015). *A lichen species list for Denali National Park and Preserve, Alaska, with comments on several new and noteworthy records*. *Evansia*, 32(4), 195-215. Retrieved from: <https://irma.nps.gov/DataStore/DownloadFile/534310>.

Vitt, D. H., Marsh, J. E., & Bovey, R. B. (1988). *Mosses, lichens & ferns of northwest North America*. Edmonton, Alberta: Lone Pine Publishing.

#### Standards References:

Alaska Comprehensive Center. (2012). *Guide to Implementing the Alaska Cultural Standards for Educators*. Juneau, AK: Alaska Department of Education and Early Development. Retrieved from: <https://education.alaska.gov/standards/cultural>

Alaska Native Knowledge Network. (1998). *Alaska standards for culturally responsive schools*. Fairbanks, AK: University of Alaska Press. Retrieved from: <http://www.ankn.uaf.edu/publications/culturalstandards.pdf>

National Research Council, the National Science Teachers Association, the American Association for the Advancement of Science, and Achieve. (2013). *The next generation science standards*. Retrieved from <http://www.nextgenscience.org/next-generation-science-standards>.

State of Alaska Department of Education and Early Development. (2016). *Content and performance standards for Alaska students*. Juneau, AK: Author. Retrieved from: <https://education.alaska.gov/akstandards/standards/ContentStandards.pdf>

State of Alaska Department of Education and Early Development. (2019). *K-12 Science Standards for Alaska*. Juneau, AK. Author. Retrieved from: <https://education.alaska.gov/akstandards/science/science-standards-for-alaska.pdf?v=1>

State of Alaska Department of Education and Early Development. (2012). *Alaska English/Language Arts and Math Standards*. Juneau, AK: Author. Retrieved from: [https://education.alaska.gov/akstandards/standards/ELA\\_and\\_Math.pdf](https://education.alaska.gov/akstandards/standards/ELA_and_Math.pdf)

#### **Informed by the School of Education Vision, Mission, and Conceptual Framework:**

We believe that the preparation and support of professional educators is the shared responsibility of the University of Alaska Anchorage and our partners, and that our programs must evolve dynamically in response to unique community needs, research, and continuous program assessment. This PACE course is designed to meet a professional development need in response to our partner school districts and professional organizations. The course fits within the mission of the UAA School of Education as we encourage lifelong learning to meet the challenges of a rapidly changing world.

**Link to Alaska Educator Content and Performance Standards:**

This professional development is rooted in the fundamentals of Alaska's standards for teachers, administrators, and beginning teachers in Alaska's Administrative Code, 4 AAC 04.200. It is offered to encourage and support practicing educators attain, maintain, or surpass the standards for effectively preparing today's students for successful lives and productive careers. (<https://education.alaska.gov/standards/other-standards>)

**Learning Forward Standards for Professional Learning:**

This course is further informed by the Learning Forward Standards for Professional Learning which outline the "characteristics of professional learning that leads to effective teaching practices, supportive leadership, and improved student results." As explicit in the standards, "professional learning is for educators to develop the knowledge, skills, practices and dispositions they need to help student perform at a higher levels." (<https://standards.learningforward.org>)

**Course Policies:****Incomplete Grades**

Due to the nature of this course, grades of incomplete will not be permitted.

**ADA Policy**

The provision of equal opportunities for students who experience disabilities is a campus-wide responsibility and commitment. Disabilities Support Services (DSS) is the designated UAA department responsible for coordinating academic support services for students who experience disabilities. To access support services, students must contact DSS (786-4530 or 786-4536 TTY) and provide current disability documentation that supports the requested services. Disability support services are mandated by Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) of 1990. Additional information may be accessed at the DSS Office in RH 105 or on-line at [www.uaa.alaska.edu/dss](http://www.uaa.alaska.edu/dss).

**Academic Dishonesty Policy**

Academic integrity is a basic principle that requires all students to take credit only for the ideas and efforts that are their own. Cheating plagiarism, and other forms of academic dishonesty are defined as the submission of materials in assignments, exams, or other academic work that is based on sources prohibited by the faculty member. Academic dishonesty is defined further in the "student Code of Conduct." In addition to any adverse academic action that may result from the academically dishonest behavior, the University specifically reserves the right to address and sanction the conduct involved through student judicial review procedures and the Academic Dispute Resolution Procedure specified in the University catalog.

**Professional and Ethical Behavior**

University of Alaska Anchorage School of Education students are expected to abide by the State of Alaska Code of Ethics of the Education Profession and professional teaching standards as they concern students, the public, and the profession. The standards, adopted by the Professional Teaching Practices Commission, govern all members of the teaching profession. A violation of the code of ethics and professional teaching standards are grounds for revocation or suspension of teaching certification.

**Technology Integration**

University of Alaska Anchorage School of Education students are expected to (a) demonstrate sound understanding of technology operations and concepts; (b) plan and design effective learning environments and experiences supported by technology; (c) implement curriculum plans that include technology applications in methods and strategies to maximize student learning; (d) facilitate a variety of effective assessment and evaluation strategies; (e) use technology to enhance productivity and professional practice; and (f) understand the social,

ethical, and human issues surrounding use of technology in PreK-12 schools and apply those principles in practice.

### **Course Safety and Risk**

This course is sponsored by Alaska Geographic and the Murie Science and Learning Center. The University of Alaska Anchorage provides the credit option for interested participants. This course takes place entirely outdoors and within a remote area of Alaska. Field courses, such as this, do have inherent risks. These risks will be outlined by the course instructors and in the Alaska Geographic Participant Release of Liability, Waiver of Claims, Assumption of Risks, and Indemnity Agreement form. This form will be provided at the time of registration and a signed copy is required in order to attend.

### **Non-Discrimination Policy**

The University of Alaska is an affirmative action/equal opportunity employer and educational institution. The University of Alaska does not discriminate on the basis of race, religion, color, national origin, citizenship, age, sex, physical or mental disability, status as a protected veteran, marital status, changes in marital status, pregnancy, childbirth or related medical conditions, parenthood, sexual orientation, gender identity, political affiliation or belief, genetic information, or other legally protected status. The University's commitment to nondiscrimination, including against sex discrimination, applies to students, employees, and applicants for admission and employment. Contact information, applicable laws, and complaint procedures are included on UA's statement of nondiscrimination available at [www.alaska.edu/nondiscrimination](http://www.alaska.edu/nondiscrimination).